A new species of the whale-louse Syncyamus (Crustacea: Amphipoda: Cyamidae) ectoparasitic on dolphins from South Africa

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ABSTRACT

A new species of whale-louse, *Syncyamus aequus* **sp. nov.**, ectoparasitic on the Common dolphin, *Delphinus delphis* Linnaeus, the Blue-white dolphin, *Stenella coeruleoalba* (Meyen), and on *Tursiops aduncus* (Ehrenberg), is described and figured from material collected on the South African coast. The cyamids were taken from the blowhole, snout, mouth, and eye of the hosts, and have the smallest adult body size of any species known to date. The status of *Syncyamus* is reviewed. A table summarizes the sparse literature on cyamid/dolphin associations.

INTRODUCTION

In an earlier paper (Lincoln & Hurley 1974a), the authors described a new genus and species of cyamid, *Scutocyamus parvus*, from the common North Atlantic White-beaked dolphin, *Lagenorhynchus albirostris* Gray. With a maximum recorded body size (ovigerous female) of 3,1 mm this was the smallest whale-louse species known at that time. Just completed (Lincoln & Hurley, in press) is an account of a second species of *Scutocyamus*, this time from New Zealand, which has a still smaller body size than *S. parvus*, but in this instance the measurement comes from a non-ovigerous female which may understate the true maximum body size of the species. In the authors' experience the ovigerous specimens are usually slightly larger than the non-ovigerous ones. *Scutocyamus* is especially interesting as one of the few examples of a cyamid that parasitizes the smaller toothed cetaceans, the porpoises and the dolphins (Leung 1967).

A recent collection from the Cape coast of South Africa has now furnished further evidence of cyamids infesting dolphins. The cyamid taken from three different hosts, *Delphinus delphis, Stenella coeruleoalba,* and *Tursiops aduncus*, also has a body size smaller than *Scutocyamus parvus*. The largest of the ovigerous females in the collection is only 2,8 mm in length—so small that had it not been for eggs in the brood pouches the authors might have overlooked the specimens as juveniles of an indeterminable species. The cyamids can be referred to the genus *Syncyamus* Bowman, 1955, but represent a hitherto undescribed species. The

name *Syncyamus aequus* **sp. nov.** is proposed for this species—the specific epithet, taken from the Latin meaning impartial, alluding to the non host-specific habit of this species.

The material was provided by Dr Graham J. B. Ross of the Port Elizabeth Museum and reached the authors in two parts. The first collection came via Professor J. L. Mohr, recently retired from the Department of Zoology at the University of California, Los Angeles. It had been sent to the University by Dr Ross, in the first instance to Dr Yuk-Maan Leung, the foremost of recent workers on cyamids, whose premature death in 1976 was a sad loss from the ranks of amphipodologists. The remainder of the material came to the authors directly from Dr Ross, when the manuscript of the present paper was nearing completion. The authors are grateful to Dr Ross and Professor Mohr for the opportunity to examine this material.

SYSTEMATICS

Genus *Syncyamus* Bowman, 1955

DIAGNOSIS

Cyamidae with pereopod 2 larger than 1; antenna 1, 4-articulate; antenna 2, 2-articulate; maxilliped reduced to a simple flap. Unguis not distinct on pereopod 1. Gills simple. Pereon segments 6 and 7 fused. Type species *Syncyamus pseudorcae* Bowman, 1955.

The fusion of pereon segments 6 and 7, a key characteristic of this genus, caused some initial confusion. Although apparently fused, there was sufficient indication of a possible suture line to cast doubt on this character until closer examination of prepared specimens using interference phase contrast removed any doubts. The impression of a weak suture line, which is seen with a dissecting microscope under reflected light, may be produced by some subsurface division or the topography of the cuticle.

Syncyamus aequus **sp. nov.**

(Figs 1 a–d, 2 a–c, 3 a–c)

DESCRIPTION

Length of body from front margin of head to posterior end of pereon in ovigerous female 2,3–2,8 mm, non-ovigerous female 1,6–2,5 mm, male 1,7–2,2 mm; maximum body width on pereon segment 5. No body pigmentation present—all specimens preserved in alcohol. Body narrowly oval in outline with head strongly immersed in pereon segment 2 (pereon segment 1 is fused with the head); anterolateral margins of pereon segment 2 asymmetrically bilobed anteriorly (Fig. 1b). Pereon segments 3–4 subequal in width, little shorter but wider than segment 2 in female, very much shorter and narrower in male; pereon segments 5 and 6 subequal in length and width, pereon segment 7 subtriangular, fused with segment 6, posterior margin weakly sinuous. Ventral pereon surface with 1 pair of short spines on segment 7, 2 pairs on segment 6, and additionally in male only, 1 pair on segment 5. Pleon very small, bilobed. Head sub-rounded; eyes small, oval.

Antenna 1 small, 4-articulate, with articles 2 and 4 much shorter than 1 and 3, apex bearing small group of stout setae. Antenna 2 extremely small, 2-articulate; article 2 much longer than 1, with about 8 stout distal setae. Upper lip fleshy, tending to bilobed (the mouthparts were studied *in situ* using interference phase contrast—the appendages were too fragile to be satisfactorily removed without destroying the specimen); distal surface of upper lip densely fringed with fine setae. Mandibles not easily distinguished, left incisor apparently with 7 teeth, right with 6 teeth. Lower lip inner lobes fused into slender setose plate, outer lobes broad and rounded, setose distally. Maxilla 1 palp short, 1-articulate, about 6 well developed

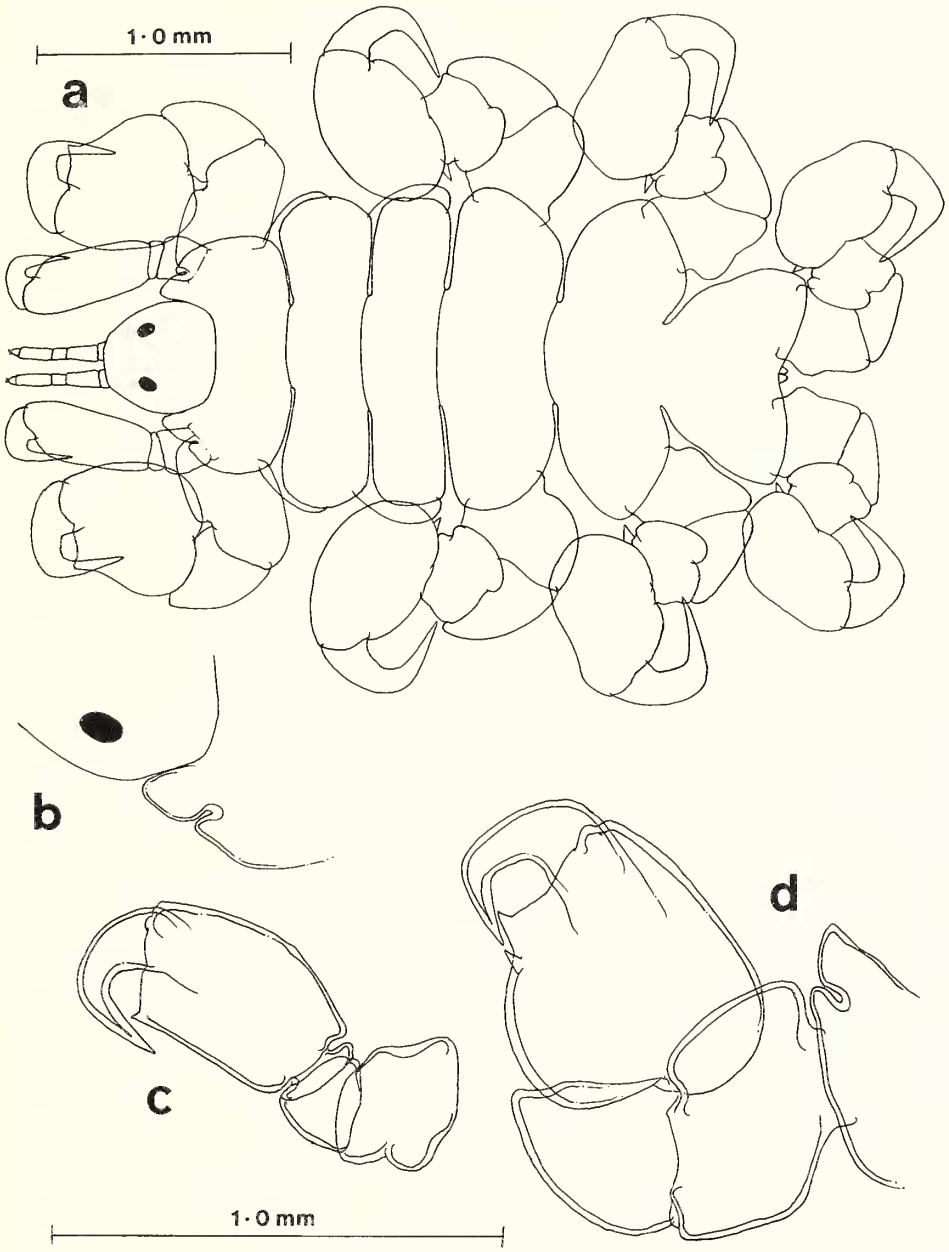

Fig. 1 *Syncyamus aequus* sp. nov. female holotype a, entire dorsal; b, anterolateral angle of first free pereon segment; c, pereopod 1 ventral; d, pereopod 2 ventral. Bar scale 1,0 mm.

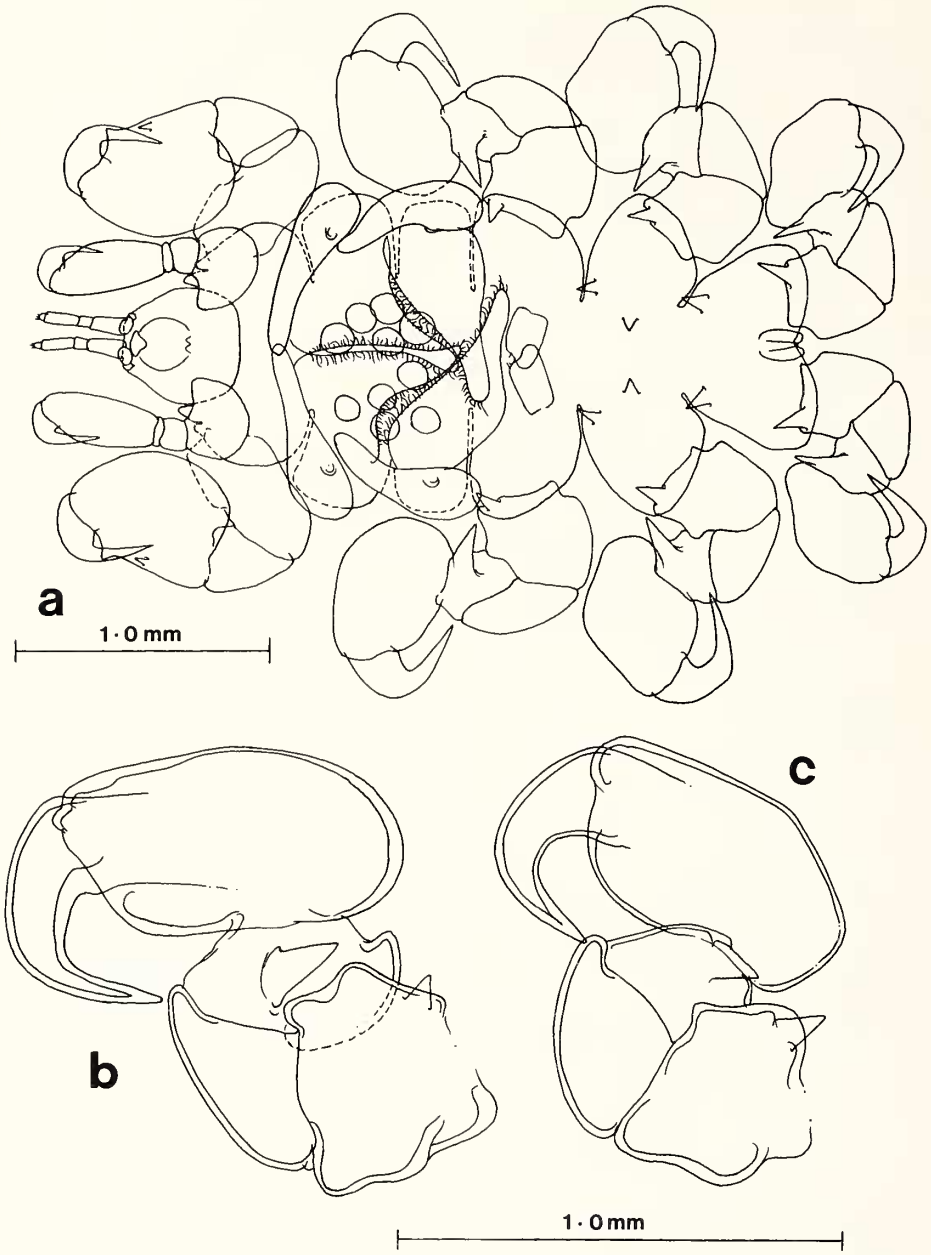

Fig. 2 *Syncyamus aequus* sp. nov. female holotype a, entire ventral; b, pereopod 5 ventral; c, pereopod 7 ventral. Bar scale 1,0 mm.

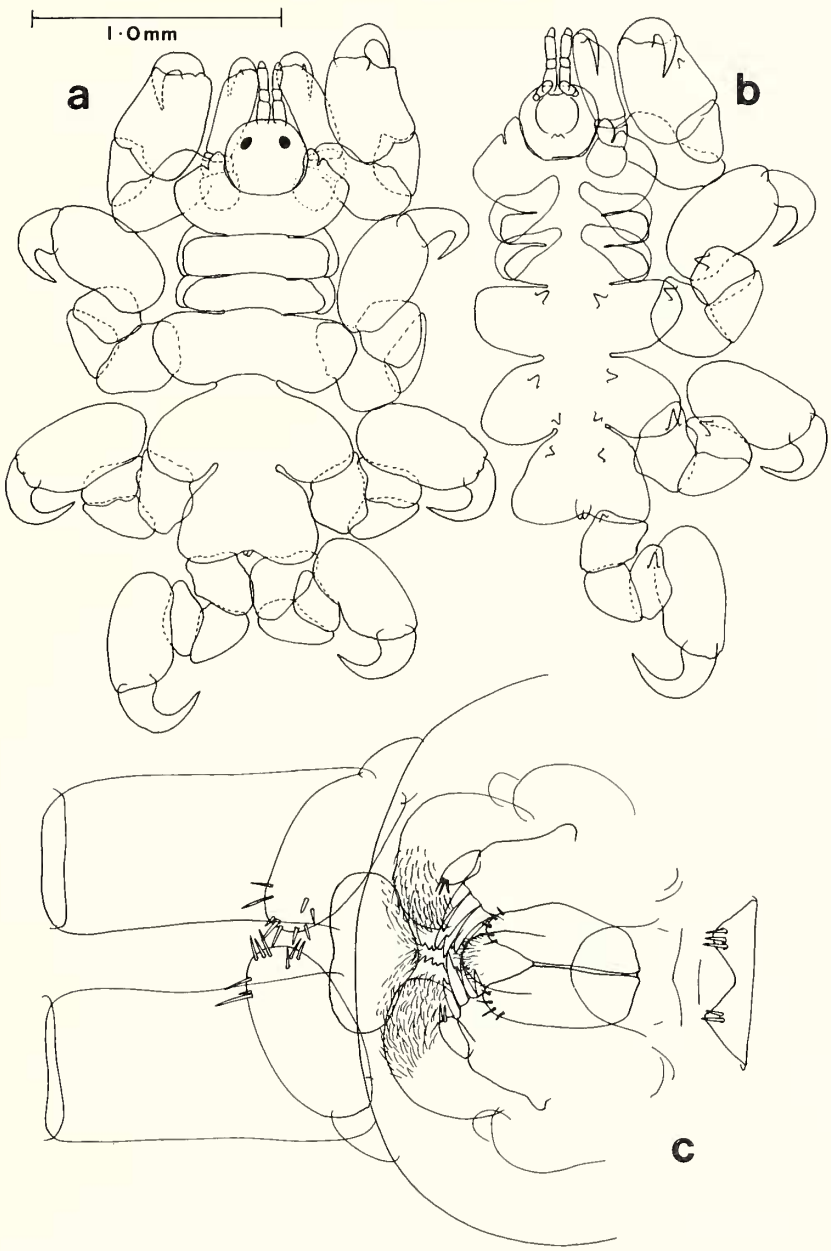

Fig. 3 *Syncyamus aequus* sp. nov. paratypes. a, entire dorsal, male; b, entire ventral, male (right pereopods omitted); bar scale 1,0 mm; c, mouthparts *in situ*, female (high magnification interference phase contrast).

apical teeth on outer plate. Maxilla 2 a single plate, slightly tapering distally with 4–5 stout apical setae; left and right maxillae coalesced along proximal three-quarters of mid-line, only divergent distally. Maxilliped vestigial, formed from small triangular lobes fused into cleft flap, apex of each lobe with 2–3 stout setae.

Pereopod 1 (Fig. 1c) smaller than 2, 5-articulate, propodus subrectangular, palmar margin straight, transverse, delimited by small tooth. Pereopod 2 (Fig. 1d) robust, 4-articulate, propodus slightly longer than wide, anterior and posterior margins strongly convex, palm transverse, delimited by small tooth with accessory tooth on posterior margin close to apex of dactylus. Pereopods 5–7 (Fig. 2b, c) robust, 5-articulate, basal article with large ventral spine on anteroproximal angle, article 3 with very large spine on ventral surface and rounded lobe on inner dorsal surface, propodus oval, palm simple, convex, dactylus strongly curved. Gills short, bluntly rounded apically, directed anteromedially, little shorter in male than female; no accessory gills in male. Brood plates triangular, tapering distally, adjacent margins setose. Holotype female with 10 eggs in brood pouch. Genital valves quadrate.

MATERIAL EXAMINED

4 ♀♀, 1 ♂, 2 juv: from *Delphinus delphis*, 1,86 m, male (PEM N 364), 3 miles 110° off East London, South Africa, 26 May 1978, floating dead at sea. Collected from mouth 3 ♀♀ (ovig.), body lengths, 2,7 mm (holotype), 2,8 mm, 2,4 mm; 1 ♀ (non ovig.), 2,2 mm: from axilla 1 ♂, 2,2 mm: from eye 1 juvenile, 1,1 mm: from blowhole 1 juvenile, 1,2 mm. Registration nos. PEM K2a (holotype), PEM K2 b–g (paratypes).

3 ♀♀, 3 ♂♂, 3 juv: from snout and blowhole of *Stenella coeruleoalba*, 2,28 m, female (PEM N 264), Humewood Beach, Port Elizabeth, 26 December 1975. Body lengths; ♀ (ovig.), 2,4 mm; 2 ♀♀ (non ovig.), 2,1 mm, 2,0 mm; 3 ♂♂, 1,7 mm, 1,8 mm, 1,9 mm. Registration no. PEM K7.

1 ♀, 1 ♂, 2 juv: from blowhole of *Stenella coeruleoalba*, 1,96 m, male (PEM N 229), Swartkops River mouth, Algoa Bay, 18 February 1975. Body lengths; ♀, 1,6 mm; ♂, 1,7 mm. Registration no. PEM K8.

1 ♀, 1 ♂: from snout of *Stenella coeruleoalba*, estimated length 2,15 m, male (PEM N 443), Swartkops River mouth, Algoa Bay, 12 March 1980. Body lengths; ♀ (with brood), 2,3 mm; ♂, 1,7 mm. Registration no. PEM K1.

1 ♂, from blowhole of *Tursiops aduncus*, 2,34 m, male (PEM N 358), Salt Rock, Natal, 17 April 1978. Body length 1,9 mm. Registration no. PEM K3.

1 ♂, from blowhole of *Tursiops aduncus*, 1,72 m, immature male (PEM N 331), Natal coast, October 1977. Body length 2,0 mm. Registration no. PEM K4.

2 ♀♀, from blowhole of *Tursiops aduncus*, 2,5 m, male (PEM N 333), Natal shark nets, October 1977. Body lengths, 2,5 mm, 1,8 mm. Registration no. PEM K5.

1 ♂, from blowhole of *Delphinus delphis*, immature (PEM N 320), 1 mile west Cape Receife, Algoa Bay, 10 September 1977. Body length 1,8 mm. Registration no. PEM K6.

The holotype and all paratypes are registered in the collections of the Port Elizabeth Museum, South Africa. One paratype, PEM K2g, has been transferred to the British Museum (Natural History), London.

DISCUSSION

This is only the second species of *Syncyamus* named to date, the other being *S. pseudorcae* Bowman found on the False killer whale, *Pseudorca crassidens* (Owen), in the Gulf of Mexico (Bowman 1955). The new species *Syncyamus aequus* is very close to *S. pseudorcae*, but can be distinguished by the detailed morphology of pereopods 1 and 2, by the asymmetry of the anterior lobes of pereon segment 2, and by body size.

In a subsequent paper, Bowman (1958) identified as *Syncyamus* a collection of small cyamids taken from a dolphin in Panama Bay, although he was uncertain whether they represented a species distinct from *S. pseudorcae*. The largest of these Panama amphipods was an ovigerous female of 3,0 mm body length, considerably smaller than the 4,8 mm female holotype of *S. pseudorcae*, and according to Bowman pereon segments 6 and 7 were not fused. The presence of a suture between segments 6 and 7 should strictly place the material outside the diagnosis of *Syncyamus*, but in the authors' experience this is a rather subjective character as already mentioned for the present material. Where segments are 'relatively fused' and the specimens very small, it can be extremely difficult to resolve precise surface structure using a light microscope. Bowman's Panama material may belong to the species described in this paper—the brief notes available, especially the body size and the reference to the inner anterior lobe of pereon segment 2 being larger than the outer, are consistent with the present description. The dolphin from which the Panama cyamids were collected was tentatively identified for Bowman from a colour photograph as "the long-snouted dolphin, *Stenella graffmani* (Lönnberg)".

TABLE 1

Cyamid/dolphin associations

HOST	PARASITE
Pseudorca crassidens (Owen) False killer whale	*Syncyamus pseudorcae* Bowman *Isocyamus delphini* (Guérin-Méneville)
Phocoenoides truei Andrews True's dolphin	*Neocyamus physeteris* (Pouchet)
Stenella graffmani (Lönnberg) Gulf of Panama spotted dolphin	*Syncyamus* sp.
Stenella longirostris (Gray) Long-beaked dolphin	*Syncyamus* sp.
Stenella coeruleoalba (Meyen) Blue-white dolphin	*Syncyamus aequus* sp. nov. *Syncyamus* sp.
Delphinus delphis Linnaeus Common dolphin	*Isocyamus delphini* (Guérin-Méneville) *Syncyamus aequus* sp. nov. *Syncyamus pseudorcae* Bowman
Grampus griseus (Cuvier) Risso's dolphin or Grampus	*Isocyamus delphini* (Guérin-Méneville)
Tursiops nuuanu Andrews Pacific or Little Bottle-nosed dolphin	*Syncyamus* sp.
Tursiops aduncus (Ehrenberg) Indian Ocean Bottle-nosed dolphin	*Syncyamus aequus* sp. nov.
Steno bredanensis (Lesson) Rough-toothed dolphin	*Isocyamus delphini* (Guérin-Méneville)
Lagenorhynchus albirostris Gray North Atlantic White-beaked dolphin	*Scutocyamus parvus* Lincoln & Hurley
Cephalorhynchus hectori (Van Beneden) Pied Hector's dolphin	*Scutocyamus* sp.

The few additional references to *Syncyamus* in recent literature suggest that their association with dolphins deserves further attention. Leung (1967, 1970) gives 4 different hosts and localities for species listed simply as *Syncyamus* sp.; the Long-beaked dolphin, *Stenella longirostris* (Gray), from the Gulf of California, the Common dolphin, *Delphinus delphis* Linnaeus, from Gibraltar, the Pacific Bottle-nosed dolphin, *Tursiops nuuanu* Andrews, from Mexico, and the Blue-white dolphin, *Stenella coeruleoalba* (Meyen), from an area between Hawaii and the Marshall Islands in the Pacific. The latter record is from the same host as that of *Syncyamus aequus* described in this paper. Leung noted a distinct suture line between pereon segments 6 and 7 in the Gibraltar specimen mentioned above. The authors have had the opportunity to examine this specimen and conclude that the posterior segments are in fact fused, or at least relatively so—there is no suture on the cuticle surface, although a line is apparent at low magnification under a dissecting microscope. The concept of fused or coalesced in these small cyamids is open to interpretation and may cause problems in future work on *Syncyamus*. The authors measured the body length of the Gibraltar specimen as 4,1 mm, not 3,8 mm as given by Leung, and in their view this cyamid belongs to Bowman's species, *Syncyamus pseudorcae*.

A potential third species, or a senior synonym of one of the two existing species, was published by Costa (1866) as *Cyamus chelipes*, from an unidentified dolphin collected in the Bay of Naples. Unfortunately, Costa's description and figures are totally inadequate for comparison with *S. pseudorcae* and *S. aequus*, except to say that the species probably belongs to the genus *Syncyamus* (Bowman 1958). It may well have been the same as Leung's Gibraltar species which the authors have determined as *S. pseudorcae*.

In view of Leung's comments on the lack of host specificity in dolphins it is worthwhile bringing the list of cyamid/dolphin associations up-to-date (Table 1). Source references for this tabulation are Bowman (1955, 1958), Leung (1967, 1970), Lincoln & Hurley (1974a, b, present paper, and in press), Mörzer Bruyns (1971).

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